STATEMENT OF BASIS
for Sludges and Contaminated Soils

for

Chevron/Texaco
Cincinnati Facility, Hooven, Ohio
EPA I.D. No. OHD 004 254 132

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Statement of Basis for
Sludges and Contaminated Soils
Chevron/Texaco
Located in Hooven, Ohio

I. INTRODUCTION

This Statement of Basis (SB) explains the proposed remedy for sludges and contaminated soils at the former Chevron/Texaco Refinery Facility. In addition, the SB includes summaries of all corrective measure alternatives, pertaining to sludges and contaminated soils, evaluated by Chevron/Texaco. The United States Environmental Protection Agency (U.S. EPA) will select a final remedy for sludges and contaminated soils at the Chevron/Texaco facility only after the public comment period has ended and the information provided by the public has been reviewed and public comments considered. A Statement of Basis for the Groundwater Contamination at the site will be issued separately to allow for quicker implementation of the sludges and contaminated soils remedy.

This SB is being issued by U.S. EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). The document summarizes information that can be found in greater detail in the final RCRA Facility Investigation (RFI) and the Corrective Measure Study (CMS) for Sludges and Contaminated Soils Reports and other pertinent documents contained in the Administrative Record. U.S. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the Chevron/Texaco facility and the RCRA activities that have been conducted.

U.S. EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all corrective measure scenarios. The public can be involved in the remedy selection process by reviewing the documents contained in the Administrative Record and attending the public meeting scheduled for

July, 31 2003 at the Hooven Elementary School.

II. **PROPOSED REMEDY**

The U.S. EPA is proposing the following remedy to address existing sludges and contaminated soils at the Chevron/Texaco facility:

! Domestic Off-Site Disposal. Excavation and transportation of soils and sludges (classified as CAMU eligible wastes) to an off-site hazardous waste landfill.

III. **FACILITY BACKGROUND**

The Chevron/Texaco facility is located in Whitewater Township, Hamilton County, Ohio, just east of the town of Hooven, and west of the Great Miami River. Land use surrounding the Chevron/Texaco facility is residential, commercial and wooded to the west. Primarily wooded land along the Great Miami River borders the facility to the north, east and south. Commercial retail property is developed along Rte. 128 southwest of the facility. The facility also includes a Land Treatment Unit (or Landfarm) located on a ridge northwest of the main potion of the facility. Two islands (No.1 and No. 2) in the Great Miami River are also considered part of the facility, underground pipelines pass under the islands and lead to a dock on the Ohio River (Figure 1). The manufacturing portion of the Chevron/Texaco facility was operated from 1931 until 1986. Gulf Oil Corporation operated the facility from 1931 until 1985, Chevron acquired Gulf Oil in 1985 and assumed operation until May 1986 when refinery operations were terminated. The refinery produced gasoline, jet fuels, diesel, home-heating fuels, asphalt, and sulfur. Refinery sludges and solids, many classified as hazardous wastes, were also generated during the manufacturing operations. Currently, only four buildings remain standing. Other buidings and structures have been demolished.

On January 21, 1985, a hydrocarbon sheen was observed seeping into the Great Miami River near the south boundary of the Chevron/Texaco Facility. The seep indicated a hydrocarbon plume in the groundwater under the facility. Hydrocarbon recovery systems were installed by Chevron/Texaco in 1985 and a larger network of withdrawal wells and extraction wells have been installed and operated since then. Currently, Chevron/Texaco pumps and treats 4 to 5 million gallons of groundwater on a seasonal basis. Analysis of the hydrocarbon wastes in groundwater indicated it was primarily refined leaded gasoline and a smaller part diesel fuel. The hydrocarbon plume is estimated to have been 5,000,000 gallons in total with approximately 3,530,000 gallons recovered to date. The analysis of what the proper solution is to remedy the groundwater is currently in a Draft Groundwater Corrective Measures Study conducted by Chevron/Texaco. When that document is finalized, another Statement of Basis explaining the proposed remedy for groundwater will be issued by U.S. EPA.

On May 13, 1993, Chevron entered into an Administrative Order on Consent (Consent Order) with U.S. EPA that required Chevron to conduct the necessary investigations (RFI) to fully identify the nature and extent of contamination at the facility and to evaluate the long-term corrective measures (CMS) necessary to protect human health and the environment. A portion of the investigations focuses on the soils and sludges. (The following discusses the investigation results, samples, and analysis, as they pertain to soils and sludge at the Chevron/Texaco facility.)

The Description of Current Conditions Report (CCR) identified locations of possible waste disposal areas, referred to as Solid Waste Management Units (SMWUs) and Areas of Concern (AOCs). The SWMUs and AOCs can be seen in Figure 2. The majority of the SWMUs are located along the western boundary of the facility. Most SWMUs and AOCs are associated with petroleum refinery waste water treatment conducted when the refinery was active. The wastes include lime sludge, slop oil emulsions, API separator sludges and soils, crude oil sludges, primary separator sludge, fuel oil tank bottoms, clarification sludge, and biosolids.

Many of the SWMUs have been excavated by Chevron/Texaco and their contents taken off site for disposal. These include SWMU 1,2,3, portions of 4, 9/13, 22, X, and Y. SWMUs 11 and 14 were removed and disposed off site prior to the Consent order between Chevron/Texaco and U.S. EPA in 1993. Confirmatory sampling was conducted on all the SWMU removals and removal reports were reviewed and approved by U.S. EPA. Waste removal actions were also conducted in the Tank 61/62 area, Tank 63 Area, and various areas of buried lead tank bottoms, and surficial lead-contaminated soils. The removals were based on SWMU and soil samples results, which resulted in ranking of the SWMUs by risk, removing the highest risk SWMUs first. The SWMUs and AOCs that remain are being addressed under this proposed remedy. Of the remaining SWMUs on site, SWMUs 7,8,10, and 33 make up the largest volume. Their volume, RCRA status, and waste descriptions are listed in Table 1.

A. Investigation Results

These investigation results consist of samples of soils and waste sludges sampled at the facility. Soil vapor investigations were also conducted. However, soil vapor results will be addressed in the groundwater statement of basis. The soil vapors originate primarily from the refined product releases that make up the groundwater plume under the site. The direct link of the soil vapor to the groundwater plume is the reason for addressing it in that future document.

1. Soil Samples

Soil borings were conducted to characterize the contaminated sediments beneath the facility. Sampling of soils occurred across the site in two types of sampling: grid and biased sampling. The grid sampling was designed to evaluate the average conditions across the facility in an unbiased manner. The biased sampling was used to delineate areas of potential contamination around selected SWMUs and AOCs.

a. Grid Sampling The grid sampling consisted of 60 soil borings across the site in a large grid (Figure 3). Samples were taken at 0.5 and 9.0 feet. Two samples from each of the sixty soil borings were submitted for laboratory analysis for the chemicals in the soils. Samples were analyzed for Volatile Organic Compounds (VOCs), Semi-Volatile Organics (SVOCs), Metals, Cyanide, and Total Organic Carbon (TOC). The analysis revealed no detection of volatile organic compounds above the detection limits used for this analysis. Further analysis of the soil samples revealed semi-volatile organics above detection limits, especially in the shallow samples at 0.5 feet. Metals sampling revealed results above detection limits. Contaminants of concern are lead, chromium, and arsenic. These results are interpreted to assess risk to human health and the environment in the Human Health Risk and Ecological Risk Assessment which will be discussed in Section IV.

b. Biased Sampling The biased soil sampling was 24 soil borings to evaluate the potential migration of contaminants from priority SWMUs and former areas of activity. Priority SWMUs were determined by the hazardous nature of the wastes, the quantity of wastes, and the exposure scenarios. One sample from every ten foot vertical interval was chosen for analysis, based on field screening. The SWMUs and former areas evaluated in the biased borings are: SWMU1, SWMU 9/13, SWMU7/8, SWMU2/3/10, SWMU 17, SWMU 40, former marketing terminal, former tetraethyl lead building location, and the former process area. Samples were analyzed for VOCs, SVOCs, Metals, Cyanide, and Total Organic Carbon (TOC). The analysis revealed the presence of VOCs (Bezene, Ethylbenzene, Toluene, and Xylene) above the detection limits used for this analysis. Further analysis of the soil samples revealed Semi-Volatile Organics above detection limits. Metals sampling revealed results above detection limits, contaminants of concern are lead, chromium, and arsenic.

2. SWMU Samples

Samples were taken of the actual waste in the SWMUs as opposed to the soils around and adjacent to the SWMUs. The SWMUs that were sampled are SWMUs 4, 7, 8, 12,16, 29, 36, 38, 39, 41, and SS. Samples were analyzed for VOCs, SVOCs, Metals, Cyanide, and Total Organic Carbon (TOC). The analysis revealed VOCs (Benzene, Ethylbenzene, Toluene, and Xylene) above the detection limits used for this analysis. Further analysis of the soil samples revealed Semi-Volatile Organics above detection limits. Metals sampling revealed results above detection limits, contaminants of concern are lead, chromium, and arsenic. A summary of the biased, SWMU and AOC sampling data is presented in Table 2.

3. SWMU 10 and 8 Sediment Samples

Samples were taken of the sediments in SWMU 10 (wastewater treatment lagoon) and sediments in SWMU 8 north (surface impoundment), which receives runoff water from the gunite ditch. There were 8 total samples collected, 3 from SWMU 10 and 5 from SWMU 8 north. Samples were analyzed for VOCs, SVOCs, Metals, Cyanide, and Total Organic Carbon (TOC). The analysis revealed VOCs, Semi-Volatile Organics and Metals above detection limits. The prominent contaminants appearing in all the samples are SVOCs and metals.

4. SWMU 7 and 8 Surface Water Samples

Samples were taken of the surface water collected in SWMU 7 and SWMU 8 central, and 8 north. There were 12 total samples collected, 3 from SWMU 7,6 from SWMU 8 central, and 3 from SWMU 8 north. Samples were analyzed for VOCs, SVOCs, Metals, Cyanide, and Total Organic Carbon (TOC). The analysis revealed detection of Semi-Volatile Organics and Metals above detection limits. The greatest detected contaminants are metals.

IV. SUMMARY OF FACILITY RISKS

A. Risk Assessment History and Review

A conceptual Land Use Plan was prepared to guide risk assessment, remediation, and potential redevelopment of the facility. This plan is in the *Update to the Market Analysis and Land Use Plan, October 2001* developed by Chevron/Texaco. The current land use plan is a mixed-use scenario, including potential industrial/commercial, open space, and recreational uses (Figure 4). Assessment of risk at the site was addressed in the *Chevron Cincinnati Facility Phase II Facility-Wide Human Health and Ecological Risk Assessment, November, 2000*. In doing the risk assessment, the sample results discussed above were used as input. The results were screened using risk values that relate to the reuse of the area (industrial, recreational). The human health screening values used were U.S. EPA Region 9 Preliminary Remediation Goals (PRGs). The results relating to ecological areas were screened using U.S.EPA Region 5 Ecological Data Quality Levels (EDQLs). Using these screening methods, Contaminants of Potential Concern (COPCs) were determined. These COPCs were used in the conceptual site model (CSM) that summarized the relationship between the sources and the receptors.

Using the CSM, the pathways between the sources of contamination and the potential receptors of the contamination at the facility are displayed in Table 3. The sources of contamination are surface soils, subsurface soils, sediment, groundwater, and surface water. The pathways of exposure for human health are dermal contact, inhalation of vapors, inhalation of soil particles, and ingestion. The receptors for human health pathways are future industrial workers, future recreational users, construction workers, and remediation workers. The ecological receptors are terrestrial, wetland, and aquatic plants and animals.

B. Contaminants of Potential Concern (COPCs)

1. Soil COPCs

a. Industrial Reuse

COPCs for human health in surface soils for industrial reuse at the Chevron/Texaco facility are the inorganics arsenic, chromium, and lead; and the semi-volatiles benzo(a)anthracene, benzo(a) pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, ideno(1,2,3-cd)pyrene, and phenanthrene.

COPCs for human health in subsurface soils for industrial reuse at the Chevron/Texaco facility are the inorganics arsenic, and lead; the semi-volatiles 1-methylnapthalene, 2-methylnapthalene, benzo(a)anthracene, benzo(a) pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, napthalene; and the volatile organic benzene.

b. Recreational Reuse

COPCs for human health in surface soils for recreational reuse at the Chevron/Texaco facility are the inorganics arsenic, chromium, and lead; the semi-volatiles 1-methylnapthalene, 2-methylnapthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, napthalene, and phenanthrene. COPCs for ecological risk is a larger list that include the above mentioned metals and SVOCs in surface soils along with additional metals (antimony, barium, cadmium, copper, mercury, nickel, vanadium, and zinc) and additional SVOCs (chrysene, fluorene, and pyrene).

COPCs for human health in subsurface soils for recreational reuse at the Chevron/Texaco facility are the inorganics arsenic, chromium, and lead; the semi-volatiles 1-methylnapthalene, 2-methylnapthalene, benzo(a)anthracene, benzo(a) pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, ideno(1,2,3-cd)pyrene; and the volatile organic benzene. COPCs for ecological risk in subsurface soils are the SVOC napthalene; and the VOCs acetone, ethylbenzene, o-xylene, and toluene.

2. Surface Water and Sediment COPCs

a. SWMU 10 and 8 Sediment Samples (COPCs)

There are 32 COPCs for ecological receptors in the sediment in these SWMUs. Surface water and sediments were analyzed for of the metals analyzed except cobalt; the entire list of SVOCs analyzed; and the VOCs benzene and xylene.

b. SWMU 7 and 8 Surface Water Samples (COPCs)

COPCs for ecological receptors in the surface water in these SWMUs include the metals chromium copper, cyanide, lead, mercury, and zinc; SVOCs benzo(a)anthracene, phenanthrene, pyrene, and chrysene.

C. Human Health Risk Characterization

The human health risk characterization makes a quantitative estimate of the risk at the Chevron/Texaco facility. The characterization uses the COPCs, the Conceptual Site Model (CSM), an assessment of the toxicity, and an assessment of the exposure to calculate the risks. Calculations for risk characterization used two different methods, the Reasonable Maximum Exposure (RME), and the Central Tendency (CT) method. See Table 4.

The non-cancer risk characterization looks at all non-carcinogenic COPCs and arrives at a Hazard Index for these contaminants. U.S. EPA specifies that a hazard index (HI) equal to or less than 1 is considered acceptable, a hazard index greater than 1 indicates an inadequate margin of safety. The non-cancer risk exceeded the hazard index of 1 in the commercial/industrial receptor in basement indoor air. This risk will be addressed in the Groundwater Statement of Basis with an institutional control prohibiting sub-grade development.

1. Non-Cancer Risks in Recreational Reuse Area

a. Future Adolescent Recreator Calculations for noncancer hazards indicate negligible non-carcinogenic risk for a future adolescent due to ingestion, dermal, and inhalation intake of contaminants in/from surface soils. The Hazard Index for both the RME (.049) and CT (.022) methods is well below one. 1,3 Dichlorobenzene was the primary contributor to noncancer risk for recreators in the Recreational Reuse Area.

b. Future Construction/Remediation Worker Calculations for noncancer hazards indicate negligible non-carcinogenic risk for a future construction/remediation worker due to ingestion, dermal, and inhalation intake of contaminants in/from surface and subsurface soils. The Hazard Index for the RME (.61) method is below one. Arsenic is the major noncancer risk for construction/remediation workers in the Recreational Reuse Area.

2. Non-Cancer Risks in Industrial Reuse Area

a. Future Industrial/Commercial Worker Calculations for noncancer hazards indicate low non-carcinogenic risk for a future industrial/commercial worker due to oral, dermal, and inhalation exposures to soil contamination. The Hazard Index for the RME (.35) and the CT (.19) method is below one. 1,3 Dichlorobenzene was the primary contributor to noncancer risk for industrial/commercial workers in the Industrial Reuse Area.

b. Future Construction/Remediation Worker Calculations for noncancer hazards indicate low non-carcinogenic risk for a future industrial/commercial worker due to oral, dermal, and inhalation exposures to soil contamination. The Hazard Index for the RME (.32) method is below one. 1,3 Dichlorobenzene was the primary contributor to noncancer risk for industrial/commercial workers in the Industrial Reuse Area.

The cancer risks characterization looks at all carcinogenic COPCs and arrives at an estimated cancer risk. U.S. EPA's range of acceptable risk is 1×10^{-4} to 10^{-6}. This risk is equivalent to one additional person in 10,000 to one additional person in 1,000,000 contracting cancer from a lifetime exposure to these contaminants. The cancer risk, 1.7×10^{-2}, exceeded the range of acceptable risk in the commercial/industrial receptor in basement indoor air. This risk will be addressed in the Groundwater Statement of Basis.

3. Cancer Risks in Recreational Reuse Area

a. Future Adolescent Recreator Calculations for cancer hazards indicate negligible carcinogenic risk for a future adolescent due to ingestion, dermal, and inhalation intake of contaminants in/from surface soils. The total cancer risk across all exposure pathways was calculated to be 1.9×10^{-6} for the RME method and 4.8×10^{-7} for the CT method. The risks fall within or below the EPA's risk range. A subgroup of the SVOCs, the polyaromatic hydrocarbons (PAHs), were the major source of carcinogenic risk in the Recreational Reuse Area.

b. Future Construction/Remediation Worker Calculations for cancer hazards indicate negligible carcinogenic risk for a future construction/remediation worker due to ingestion, dermal, and inhalation intake of contaminants in/from surface and subsurface soils. The total cancer risk across all exposure pathways was calculated to be 5.3×10^{-6} for the RME method. The risks fall within the EPA's risk range. The PAHs were the major source of carcinogenic risk in the Recreational Reuse Area.

4. Cancer Risks in Industrial Reuse Area

a. Future Industrial/Commercial Worker Calculations for cancer hazards indicate negligible carcinogenic risk for a future industrial/commercial worker due to ingestion, dermal, and inhalation exposures to soil contamination. The total cancer risk across all exposure pathways was calculated to be 1.5×10^{-5} for the RME method and 2.0×10^{-6} for the CT method. The risks fall within the EPA's risk range. Arsenic and PAHs account for all of the estimated cancer risks from soil.

b. Future Construction/Remediation Worker Calculations for cancer hazards indicate negligible carcinogenic risk for a future construction/remediation worker due to ingestion, dermal, and inhalation intake from soil contamination. The total cancer risk across all exposure pathways was calculated to be 4.1×10^{-6} for the RME method. The risks fall within the EPA's risk range. Arsenic and PAHs account for most of this estimated risk.

D. Ecological Risks

The ecological risk characterization looks at receptors classified into terrestrial, wetlands, and Great Miami River components. Within the terrestrial component plant communities, terrestrial invertebrate communities, and wildlife are assessed. The representative terrestrial wildlife species chosen for this site were the American robin, the short-tailed shrew, the fox squirrel, the eastern cottontail, and the woodchuck. Within the wetland component aquatic life and wildlife are assessed. The representative wetland wildlife chosen were the marsh wren, the red-winged blackbird, and the raccoon. Within the Great Miami River component aquatic life and benthic life communities are assessed.

1. Aquatic Life Risk Analysis

Four small wetlands and the wastewater treatment lagoon all within the habitat restoration area were investigated. In addition the Great Miami River was assessed to evaluate the impact of site related contaminants. The wetlands (SWMU 7, SWMU 8N, SWMU 8C, and SWMU 10) are man-made wetlands resulting from old sand and gravel pits that were filled in with oil refinery wastes and/or lime sludge that collected water from precipitation and stormwater runoff. PAHs and metals appear to be the principal contaminants of concern. These areas are low quality habitat for aquatic life, due to their disturbed nature and the wastes that make up the substrate. Standing water is not always present, and at certain periods the ponds are dry. Cleanup and off-site disposal of these wastes (SWMUs 7,8 and 10) is proposed in this remedy which will eliminate the contamination source and minimize the risk of exposing aquatic life receptors to contaminants.

The Great Miami River adjacent to the facility was investigated. Surface water samples were taken to determine whether petroleum contamination was released to the river. No site related petroleum contamination was detected in the surface water. Riverbank soil samples were also collected to evaluate potential receptors of riverbank contamination to riverine receptors. Residual PAH contamination from a release of hydrocarbon seepage to the river that was discovered on January 21, 1985 affects a small area of the riverbank along the southern extent of the property. Riverbank and surface water samples indicate the impacts of this contamination on aquatic life to be minimal.

2. Terrestrial Plant and Invertebrate Risk Analysis

Potential risks to terrestrial plants and soil invertebrates were evaluated for surface soils in the recreational reuse area. Overall the primary sources of potential risk to vegetation at the site appear to be metals, particularly lead. Sitewide, effects on vegetation are not likely to be significant. However in the vicinity of SWMU7 and SWMU 8 , concentrations of several COPCs are sufficient to pose potential risks for ecological receptors. Vegetation cannot grow normally on the exposed petroleum wastes and lime sludge. Stressed vegetation was also observed near areas of exposed wastes near the SWMUs. Therefore, potential impacts on vegetation are possible at these locations.

Initial screening showed that seven metals and one PAH were detected at concentrations exceeding appropriate screening values. The Ecological Risk Assessment determines the facility-wide effects of COPCs on soil organisms are not likely to be significant. Just as determined for aquatic life, in the vicinity of SWMU 7 and SWMU 8, concentrations of several COPCs are sufficient to pose potential risks. Field observations show exposed petroleum wastes (SWMU 8) and lime sludge (SWMU 7) are present. Soil organisms are not likely to be present except near the perimeter of these exposed waste. Risks may be posed to the soil community in the immediate vicinity of the SWMUs, but they are unlikely elsewhere. Cleanup and off-site disposal of these wastes (SWMUs 7,8) is proposed in this remedy. Following excavation, backfilling of the excavations with clean fill and topsoil to prepare the site for habitat restoration. The remedy will eliminate the contamination source and minimize the potential effects of site contaminants on terrestrial plant and invertebrate receptors.

3. Wildlife Risk Analysis

The Risk Assessment indicates that site-wide risks to wildlife are not likely to be significant. Potential risks to several wildlife species from COPCs in the recreational Reuse Area were examined through modeling exposures via the food chain, drinking water, incidental soil ingestion, and inhalation. Phenanthrene was the only organic contaminant of concern for the ingestion pathway. Lead presented the greatest risk potential for avian wildlife, and vanadium presented the greatest potential ingestion risk for mammalian wildlife. With regard to inhalation, the risk calculations indicate that significant risks may be present for wildlife burrowing in areas of the site where subsurface soil is contaminated with volatile organic compounds.

Both inhalation and ingestion risks for wildlife are primarily related to elevated levels of COPCs observed in some of the SWMUs at the site, particularly SWMUs 4, 7, and 8 within the Habitat Restoration Area. The soils and sludges within SWMUs 4,7, and 8 will be excavated and taken off-site thereby substantially reducing the wildlife's contact with the waste.   Remedial actions proposed in this Statement of Basis would greatly reduce the potential risks to wildlife at the site.

V. <u>SCOPE OF CORRECTIVE ACTION</u>

A large portion of the soil and waste present at the Chevron/Texaco facility has been addressed through the removal, excavation and offsite transport, and disposal of SWMUs and AOCs. These include SWMUs 1,2,3; and portions of 4, 9/13, 22, X, and Y. SWMUs 11 and 14 were removed prior to the effective date of the Consent Order. Waste removal actions were also conducted in the Tank 61/62 area, Tank 63 Area, and various areas of buried lead tank bottoms, and surficial lead-contaminated soils. Of the remaining SWMUs on site, SWMUs 7,8,10, and 33 make up the largest volume and consisted primarily of sludges and solids from petroleum refinery wastewater treatment. The final corrective measures specified in this Statement of Basis are necessary to fully address the remaining soil and sludges at the facility.

The unacceptable ecological risks discussed in Section IV , Summary of Facility Risks, are associated with the SWMUs 7, 8, and 10. These SWMUs contain petroleum wastes and lime sludges. The cleanup objectives here are to remove the wastes from SWMUs 7, 8, and 10 and other smaller SWMUs. This cleanup will remove the primary sources of risks, and address those exposure scenarios that present ecological risk.

VI. <u>SUMMARY OF ALTERNATIVES</u>

The corrective measure alternatives analyzed to clean up soils and sludges at and from the Chevron/Texaco facility are presented below.

- **Alternative 1:** No-Action
- **Alternative 2a:** Domestic Off-Site Disposal
- **Alternative 2b:** Off-Site Disposal in Canada
- **Alternative 3:** Limited Remediation with Focused Long Term Care
- **Alternative 4:** On- Site Stabilization and Containment through a CAMU

These alternatives correspond with those outlined in the Final CMS Report for Soils and Sludges (October, 2002).

Alternative 1: No-Action

The no-action alternative provides a baseline for comparing the benefits and costs of the other alternatives. This alternative assumes that no additional actions will occur at the facility to remediate sludges and soils beyond what has already been completed.

Alternative 2a: Domestic Off-Site Disposal

The domestic off-site disposal alternative involves excavation of SWMU wastes and disposal of wastes that qualify as CAMU-eligible in an off-site hazardous waste landfill. The landfill will be a hazardous waste landfill in the United States permitted under RCRA to accept CAMU-eligible waste. The excavation of the SWMUs will be conducted until all visual evidence of waste removal has been achieved and then confirmatory sampling will be conducted in the excavation. These confirmatory samples will be analyzed and compared to Region 9 Preliminary Remediation Goals (PRGs) for industrial soil. The excavation then will be backfilled with clean fill and restoration of the surface, ecological restoration on some areas. The backfilling with clean fill separates the ecological receptors from the soil that is left in place at industrial reuse levels.

Alternative 2b: Off-Site Disposal in Canada

The international off-site disposal alternative involves excavating to remove all contaminated sludges and soils. The excavation of the SWMUs will be conducted until all visual evidence of waste removal has been achieved and then confirmatory sampling will be conducted in the excavation. These confirmatory samples will be analyzed and compared to Region 9 Preliminary Remediation Goals (PRGs) for industrial soil. The excavated wastes will be transported offsite for disposal to a hazardous waste landfill in Canada.

Alternative 3: Limited Remediation with Focused Long Term Care

This alternative proposes 1) remediation of SWMUs for which it is practicable and cost effective to be cleaned; and 2) long term control of those SWMUs which are more difficult to address (SWMUs 7,8,10,33 and SS). The long term goal of this strategy is to redevelop the land you can and “rezone” an area of the facility that contains the difficult to remediate sites under Chevron/Texaco control for long term monitoring.

Alternative 4: On- Site Stabilization and Containment through a CAMU

To accomplish cleanup under alternative 4, all contaminated soil and sludge from remaining SWMUs and AOCs will be stabilized as necessary and disposed of in a Corrective Action Management Unit (CAMU) constructed at the facility within the current location of SWMUs 10, 3, and 4, and a portion of 7.

VII. EVALUATION OF ALTERNATIVES

A. Evaluation Criteria

This section presents the process used to evaluate the five cleanup alternatives and the results of the evaluation for contaminated soils and sludges. The evaluation criteria used are described in the July 27, 1990 Advanced Notice of Proposed Rulemaking (ANPR) on RCRA Corrective Action. There are also criteria in the Consent Order, Attachment III, Task IX, pages 5-9. The ANPR criteria are a two-phased evaluation, the threshold criteria and the balancing criteria. The proposed remedies are screened to see if they meet the four threshold criteria. The remedies that meet the threshold criteria are then evaluated using five balancing criteria to identify the remedy that provides the best relative combination of attributes.

The threshold criteria say that all remedies must: (1) be protective of human health and the environment; (2) attain media cleanup standards; (3) control the source(s) of releases of hazardous waste (including hazardous constituents) that pose threats to human health and the environment; and (4) comply with applicable standards for waste management. The balancing criteria are: (1) Long-term reliability and effectiveness; (2) reduction of toxicity, mobility, or volume of wastes; (3) short-term effectiveness; (4) implementability; and (5) cost. The criteria in the Order are (A) Technical, Environmental, Human

Health, Institutional and (B) Cost Estimates. These criteria in the Order generally follow the criteria in the ANPR, and are considered in the evaluation, but the ANPR criteria are the primary evaluation criteria.

B. Rationale for Proposed Remedy

In the Corrective Measure Study for Sludges and Soils submitted October, 2002 by Chevron/Texaco, review of Corrective Measure Alternatives was conducted. The threshold criteria have been evaluated by U.S. EPA for all the proposed remedies and Alternative 1, the no action alternative, does not meet the threshold for all 4 criteria and is not considered for evaluation by the balancing criteria. Alternative 1 does not protect human health and the environment, control the source, attain any cleanup standards, or propose any waste management. Alternatives 2a, 2b, 3 and 4 met the threshold criteria.

1. Long Term Reliability

The long term reliability criterion is intended to address the ability of the chosen alternative to perform its intended function for the duration of the alternative's life. In evaluating against this criterion, past experience and bench-scale studies were used to address the alternative's durability and useful life.

Alternative 3 relies on institutional controls (rezonoing), includes little source control, offers no treatment of waste, and offers some reduction of future releases. While institutional controls help prevent access, they do nothing to remediate the contamination and can fail over the long term.

Alternative 4 employs stabilization of wastes in conjunction with consolidation and containment in an engineered containment cell, which is designed with both cap and liner. The 30-year design life offers a long-term, but limited, useful life. However, the CAMU would be located above a hydrocarbon plume, which could potentially reduce the effectiveness of the liner. Additionally, the CAMU would be located in the flood plain, adjacent to the Great Miami River.

In Alternatives 2a and 2b the remediation waste is transported off site and no longer poses a risk at the facility, and the management of the waste is transferred to the landfill owners. With respect to 2b, landfills outside the U.S. provide U.S. EPA less control of the long term future than landfills regulated by RCRA. Therefore, the long term reliability of 2b is slightly less than a U.S. landfill.

Alternative 2a, compared to the other alternatives, provides the greatest amount of long term reliability. The remediation waste is transported off site and no longer poses a risk at the facility, and the management of the waste is transferred to the landfill owners. Unlike Alternative 2b, the hazardous waste landfill is in the U.S., which provides a greater amount of regulatory control over its long term care.

2. Reduction of Toxicity, Mobility or Volume of Wastes

The assessment of the engineering and institutional controls designed to reduce mobility, toxicity, and volume provides an important balancing criterion. In evaluating against this criterion, past experience with waste treatment methods, knowledge, of the fate and transport of the contaminants, and information on the contaminants toxicity are important considerations.

Alternative 3 does do some removal that reduces the volume of the wastes on site. The reduction of mobility is in question, in that long term monitoring of the waste left in place may show migration in the future. The toxicity of the remaining wastes will not be reduced, and will be left in place.

Alternative 4 employs stabilization of wastes in conjunction with consolidation and containment in an engineered containment cell, which is designed with both cap and liner. This alternative does reduce the mobility of wastes on-site by stabilizing them and containing them in the CAMU. The toxicity is reduced somewhat through stabilization and containment in the CAMU. The volume of the waste is increased by removal and mixture with stabilization material.

In Alternatives 2a and 2b the remediation waste is transported off site but the toxicity of the wastes themselves is not necessarily reduced. Alternatives 2a, 2b, and 4 are equal in their ability to reduce toxicity, mobility and volume of wastes. The mobility of the wastes will be reduced at the receiving landfill due to 1) addition of stabilizing agents and 2) disposal in a RCRA hazardous waste landfill. The overall volume of the waste on site will be reduced. The overall volume of the wastes being disposed may be increased by addition of stabilization agents required for landfill disposal. The source will be removed and therefore the ability of the contaminants to become mobile at the Chevron/Texaco facility is reduced by off-site transport. The toxicity of the wastes themselves will not necessarily be reduced, but the ultimate disposal place, a hazardous waste landfill permitted under RCRA, will provide effective containment.

3. Short Term Effectiveness

Alternative 3 provides some short term advantages in terms of redevelopment of some SWMUs that were remediated quickly. The SWMUs that contain the greatest volumes (SWMUs 7,8, and 10) would be left in place and have long term monitoring. For these SWMUs the waste would not be remediated in the short term, and the monitoring would be long term. The short term effectiveness for Alternative 3 is poor.

Alternative 4 obtains on-site stabilization and containment through a CAMU and is effective in the short term in removing the wastes and placing them in an on-site lined and capped CAMU. The short term effectiveness is good for this alternative.

In Alternative 2a and 2b the remediation waste is transported off site and effectively removes the wastes in the short term. This provides good short term effectiveness of these remedies. Short term risks are present from transportation of the wastes, such as potential spills or releases. Engineering controls will be implemented to reduce these risks, and implement the removal safely. Alternatives 2a and 2b, compared to the other alternatives, provide the greater short term effectiveness.

4. Implementability

The implementability criterion involves evaluation of many factors, some of the most important include constructability and regulatory feasibility. Constructability addresses the technological constraints for implementing the approach. Regulatory feasibility addresses the regulatory constraints on implementing the chosen remedy.

Alternative 3 employs primarily institutional controls and does not pose any technical issues; therefore, it could be implemented swiftly. The regulatory feasibility for Alternative 3 would require extensive negotiations between the facility and regulators to arrive at acceptable terms for monitoring the wastes in place.

Alternative 4 employs stabilization, excavation, and containment in an engineered consolidation cell. Stabilization can be implemented relatively quickly (anticipated to take 30 months for all waste), and benefits (reduction of toxicity and mobility) can be seen after the 48-hour curing period, but construction of the containment cell requires double handling of waste. There is a chance of flooding during construction. Alternative 4 may also require time for regulatory negotiation prior to implementation of the remedy.

Alternative 2b is straight-forward in terms of construction aspect. This would involve excavation, transport and disposal. In terms of regulatory feasibility, however, the future availability of the Canadian landfill is uncertain. Additionally, there is currently an import/export limitation imposed at the proposed off-site disposal facility, which causes a drawn-out schedule for disposal of wastes.

Alternative 2a, excavation, transportation and disposal of wastes in a domestic landfill, provides few technological constraints. The regulatory feasibility is very good. Under the CAMU amendments, which were promulgated on January 22, 2002, CAMU-eligible wastes may be disposed in an off-site RCRA Subtitle C landfill that is permitted to accept CAMU-eligible wastes. U.S. EPA has determined, in an August 29, 2002 letter to Chevron/Texaco, that no principal hazardous constituents (PHCs) were designated for the CAMU eligible wastes at the Chenron/Texaco Facility. In general, the designated principal hazardous constituent (PHC) concentrations in the wastes must be reduced by 90%, but are not required to be reduced to less than 10 times the Land Disposal Restriction (LDR) Universal Treatment Standards (UTS). The general designation for PHCs is: 1) carcinogens that pose a potential or direct risk from ingestion or inhalation at or above 10^{-3}, or 2) non-carcinogens that pose a risk from ingestion or inhalation an order of magnitude or greater over their reference dose (hazardous index of 10 or greater). These CAMU-eligible wastes will not require treatment before disposal to a hazardous waste landfill. At least one landfill in the U.S., Roachdale, Indiana has received a permit modification from an authorized state agency, (Indiana Department of Environmental Management (IDEM)) for acceptance of the CAMU-eligible waste from the Chevron/Texaco Cincinnati Facility.

IDEM issued the final decision/public notice for the Class 2 permit modification for the landfill on September 16, 2002. The effective date of the permit modification was October 4, 2002. Alternative 2a provides the best case for implementabilty due to the regulatory feasibility and constructability. Alternatives 2b and 3 face regulatory hurdles, and Alternative 4 has a constructability issue and some regulatory issues.

5. Costs

Costs involve both construction costs and operation and maintenance (O&M) costs. Table 5 presents the construction cost breakdown in 2001 dollars for each of the five cleanup alternatives. These costs include site indirect costs, mobilization/demobilization, facility management, earthwork, treatment, and disposal costs.

Table 5
Construction Cost of Cleanup ($MM)

Corrective Measure	Site Indirect Costs	Mobilization/ Demobilization	Facility Management	Earthwork	Stabilization	Disposal	TOTAL COST
Alternative 2a	$2.24	$0.012	$0	$3.46	$2.76	$14.88	**$ 23.35**
Alternative 2b	$2.24	$0.012	$0	$3.46	$1.27	$44.91	**$ 51.89**
Alternative 3	$0.74	$0.012	$0	$0.57	$0	$2.55	**$ 3.87**
Alternative 4	$3.37	$0.012	$0.008	$9.07	$3.09	$0	**$ 15.55**

In addition to construction costs, operation and maintenance costs must be considered for each alternative. Table 6 presents the cost breakdown for each of the five cleanup alternatives. These costs include site operating labor costs, maintenance materials and labor costs, auxiliary materials and energy, purchased services (such as laboratory and professional fees), treatment and disposal costs for any O&M generated wastes, and administrative costs. These costs are estimated on an Net Present Value (NPV) basis, at a 5% discount rate. Several assumptions were made in developing these costs. These assumptions include a “lifetime” of 30 years and additional monitoring efforts for up to 30 years, based on relative portions of the site that are closed to acceptable risk-based standards or require long-term monitoring.

Table 6
O&M Cost of Cleanup ($MM)

Corrective Measure	Operatin g Labor Costs	Maintenance Material and Labor Costs	Auxiliary Material s and Energy	Purchase d Services	Stabilization and Disposal	Administrati ve Costs	TOTAL NPV COST
Alternative 2a	$0	$0	$0	$0.398	$0	$ 0.04	**$ 0.44**
Alternative 2b	$0	$0	$0	$0.398	$0	$ 0.04	**$ 0.44**
Alternative 3	$0	$0.075	$0.008	$2.44	$0.265	$ 0.28	**$ 3.07**
Alternative 4	$0.09	$0.64	$0.015	$0.402	$4.001	$ 0.51	**$ 5.66**

C. Summary

Taking into account the balancing criteria analysis of the alternatives that satisfy the threshold criteria, the proposed remedy to clean up contaminated soils and sledges at the Chevron/Texaco Facility is Alternative 2a, Domestic Offsite Disposal.

Alternative 2a is the domestic off-site disposal alternative which involves excavation of SWMU wastes and disposal of wastes that qualify as CAMU-eligible in an off-site hazardous waste landfill. The landfill will be a RCRA hazardous waste landfill (e.g. in Roachdale, Indiana) permitted to accept CAMU-eligible waste. The excavation of the SWMUs will be conducted until removal of all visible waste material has been achieved and then confirmatory sampling will be conducted in the excavation. These confirmatory samples will be analyzed and compared to Region 9 Preliminary Remediation Goals (PRGs) for industrial soil. The excavation then will be backfilled with clean fill and restoration of the surface, including ecological restoration on some areas will be performed. The excavation with clean fill separates the ecological receptors from the soil that is left in place at industrial reuse levels.

1. Summary of Balancing Criteria

Alternative 2a, Domestic Off-site Disposal, was chosen as the best overall remedial approach based on the balancing criteria. The long term reliability is very good due to the off-site transport of the waste and the disposal in a domestic hazardous waste landfill. In terms of the reduction of toxicity, mobility or volume, Alternative 2a provides as effective a reduction of toxicity on-site as Alternative 2b, international off-site disposal; and reduction of volume on-site is greater than Alternative 4, on-site stabilization in a CAMU. In addition, Alternative 2a provides for low mobility of the waste in the off-site hazardous waste landfill. The short term effectiveness of Alternative 2a is very good in that it consists of the direct removal of the wastes off-site with similar effectiveness as Alternative 2b and 4, but is not as effective as Alternative 3, which has a limited initial removal of contaminated soil and sludge. In terms of implementability, Alternative 2a, consisting of the excavation, transportation, and off-site disposal of contaminated sledges and soils is a proven construction practice, and the regulatory feasability is very good, with use of the new CAMU Amendments. The waste determinations have been made by U.S. EPA and the permit modifications have been approved by IDEM. The other alternatives have some outstanding regulatory questions (leaving source in-place option) and some construct ability (CAMU construction) issues. The cost considerations are summed up by adding up the construction costs and the O&M costs. Alternative 2a has a total cost of 23.79 million dollars, which is substantially less than Alternative 2b which would cost 52.33 million, and is slightly more than alternative 4 at 21.21 million, and substantially more than Alternative 3 at 6.94 million dollars.

Domestic off-site disposal is recommended as the final remedy for the sludges and contaminated soils of the Cincinnati Facility. U.S. EPA believes that if the proposed remedy is implemented it will be protective of human health and the environment and will effectively control the human health and ecological exposures to contaminants in soil and sludges at the facility. The proposed remedy is protective of human health and the environment; takes into consideration conceptual future land reuse scenarios; and is protective based on the risks presented by the wastes on site. The source is controlled by the removal and off-site disposal of the wastes. The work plan to implement the remedy, which U.S. EPA will select after considering all comments received in response to the this Statement of Basis, will be incorporated into a Corrective Measure Implementation (CMI) Order and include air monitoring, stormwater management, flood control and worker health and safety. Implementation of the final remedy will be performed in accordance with all applicable state and federal laws and regulations.

VII. PUBLIC PARTICIPATION

U.S. EPA solicits input from the community on the corrective measures proposed for cleanup of sludges and contaminated soils. The public is also invited to provide comment on corrective measure Alternatives not addressed in this Statement of Basis. U.S. EPA has set a public comment period from June 26, 2003 through August 11, 2003, to encourage public participation in the selection process. The comment period will begin with a public meeting where U.S. EPA will present the investigations results and the proposed remedy, answer pertinent questions, and accept oral and written comments. In addition, written comments will be accepted by U. S. EPA up to the close of the comment period.

The public meeting is scheduled for Thursday, 5:30 to 9:30 PM, July 31, 2003, at the Hooven Elementary School located at 4317 Childlaw Ave., Hooven, Ohio 45033.

The proposed corrective action is issued under the provisions of Section 3008(h) of the Resource Conservation and Recovery Act of 1976 as amended 42 U.S.C. Section 6928(h). A public notice will appear on the Wednesday, June 25, 2003 in the Western Hills Press and at the 89.7 FM WNKU, NPR Radio between 6:00am and 9:00am. You can obtain more information by login in the web at: http://www.epa.gov/reg5rcra/wptdiv/permits/index.htm.

The Administrative Record for the Chevron/Texaco Facility is available at the following locations:

Public Library of Cincinnati
Miami Township Branch
8 N. Miami Rd.
Cleves, OH 45002

U.S. EPA, Region 5
Waste, Pesticides and Toxics Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604-3590
(312) 886-0902
Hours: Mon-Fri, 8:00 a.m. - 4:00 p.m.

Office of Solid and Hazardous Waste Management
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402
(937) 285-6357.

After consideration of the comments received, U.S. EPA will select the remedy and document the selection in the Final Decision and Response to Comments. In addition, public comments will be summarized and responses provided. The Final Decision and Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record.

To send written comments or request technical information on the Chevron/Texaco facility, please contact:

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To request information on the public comment period process, please contact:

Ms. Martha Yolisma Robinson
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